

Fact Sheet: FS-1016

NALCO CHAMPION TECHNOLOGY FOR YELLOW METAL PROTECTION

Refinery and petrochemical plants use yellow metal heat exchangers due to the high heat flux required to control process temperatures and deliver efficient production. The new Nalco Champion technology delivers robust and environmentally friendly yellow metal corrosion control to safeguard these critical systems.



CORROSION STRESS FACTORS:

- Water scarcity: higher cycles, high HTI, aggressive chloride and sulfate ions concentrate in the system
- Microbiological control legislation: increased halogenation
- Ammonia ingress: leaks, municipal effluent reuse
- High heat flux: at high production rates or restricted flow
- Process control issues: pH and FRC excursions

YELLOW METAL TECHNOLOGY

3D TRASAR™ Technology for Cooling Water (3DTfCW) has been safeguarding customer production and assets for over a decade. The latest Nalco Champion technological advancement to this platform enhances asset integrity and greatly improves the sustainability profile. Product stability within the system, subject to high FRC, cycles, water recycle, and process leaks, was at the core of the innovation process.

Product feed can be controlled via the 3D TRASAR system with product consumption checked with instant analytics on a

handheld analyzer. This newly developed analytical method is 10x more accurate compared to existing wet chemical triazole testing, reducing operator time and UV exposure risk.

Maintaining asset integrity is key in achieving the production goals and long run lengths required by the industry. The Nalco Champion technology for yellow metal protects critical high stress heat exchangers to help achieve this goal. The improved environmental profile allows users to improve their safety and environmental KPI's. An example of such KPI improvement at an industrial cooling water application is shown in Table 1.

	Baseline	Nalco Champion Treatment
Brass Corrosion	0.46 mpy	0.1 mpy
Mild Steel Corrosion	0.7 mpy	0.2 mpy
Inhibitor Residual	7%	74%
Cu ppm	0.031 ppm	0.018 ppm
Fe ppm	0.98 ppm	0.69 ppm

Table 1: Industrial Cooling Application

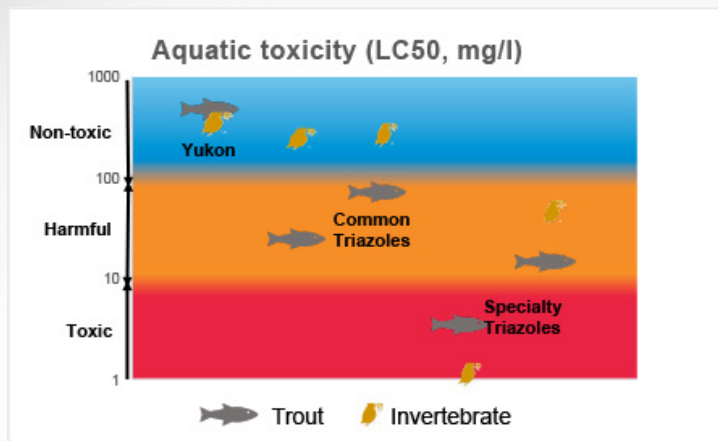


Figure 1: Nalco Champion Technology vs Triazole Aquatic Toxicity

The Nalco Champion yellow metal protection technology was designed for robustness in yellow metal corrosion inhibition with environmental protection in mind. The ecotoxicity is far superior to the conventional triazoles used. Figure 1 shows the LC50 (Lethal Concentration, 50% kill) for fish and invertebrates, which is much lower than other triazoles. Therefore, it's classed as non-toxic while specialty triazoles are toxic or harmful to the aquatic environment.

While the triazoles tend to form chlorinated species, increasing aquatic toxicity, the Nalco Champion inhibitor does not react with bleach or chlorine gas. Analyses of recirculating water from PCT studies and industrial towers showed chlorinated species were under the detection limit and no odor was observed.

INDUSTRIAL COOLING SYSTEMS TREATED WITH THE NEW NALCO CHAMPION TECHNOLOGY FOR YELLOW METAL PROTECTS:

- Mixed metallurgy systems: admiralty brass, copper, Copper/Nickel
- Make-up water quality: soft water, high TDS & organics surface water
- Chlorination: intermittent to continuous 0.4-0.7 FRC utilizing bleach or chlorine gas, with periodic excursions > 2.0 ppm FRC
- Recirculation water: pH=7.5 - 8.5, up to 15 days HTI and 15 cycles

The Nalco Champion technology consistently improved corrosion results, Figure 2 shows the average results for 5 separate industrial sites.

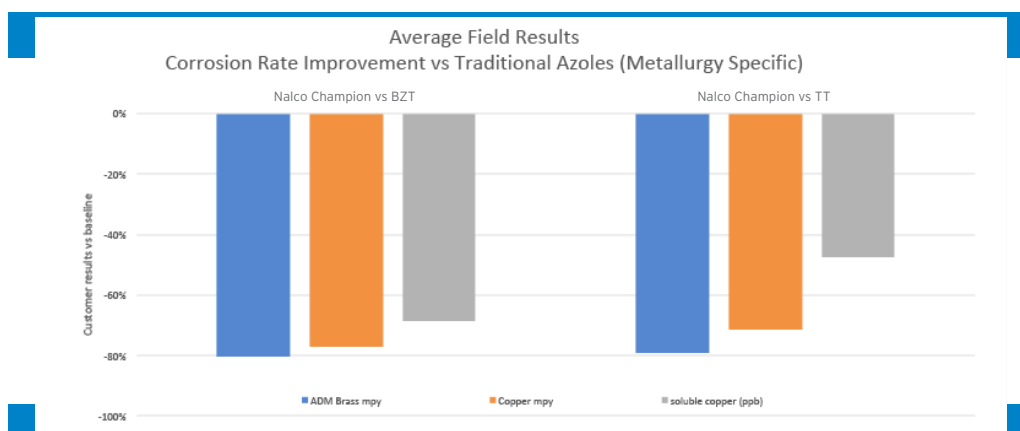


Figure 2: Field results: 5 industrial site average

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